

REMARKS

Claims 19-22, 24, 25, 27-35 and 37-39 are active in the present application.

Reconsideration is respectfully requested.

The present invention is related to a laminated glass glazing that is transparent and has infrared light reflecting characteristics.

Invention

The present invention is directed to a transparent laminated glazing that is formed of (i) an exterior glass pane having a first face intended to face the exterior of a vehicle or a room and a second face intended to face the interior of a vehicle or a room, (ii) an interior glass pane having a third face intended to face the exterior of the vehicle or room and a fourth face intended to face the interior of the vehicle or room, (iii) an antisun coating that reflects solar rays with wavelengths greater than 780 nm that comprises a stack of layers, this stack of layers comprising at least a metallic layer positioned between two dielectric layers or between two dielectric coat systems each comprising at least two dielectric layers, wherein each of the dielectric layers is a metal oxide or a metal nitride, the antisun coating being applied to the second face of the exterior glass pane, and (iv) a low-emissive transparent coating that reflects heat rays with wavelengths greater than 1100 nm. The exterior glass pane is closer to the exterior of the vehicle or room, the interior glass pane is closer to the interior of the vehicle or room, the exterior glass pane and the interior glass pane are united by a thermoplastic intercalating sheet that contacts the second face of the exterior glass pane and the third face of the interior glass pane, and the antisun coating is closer to the exterior of the vehicle or room than the low-emissive transparent coating.

Prior Art Rejection

Claims 19-21, 24, 25, 27, 29, 32-34, 37 and 38 stand rejected based on 35 USC 103(a) as obvious over Frost et al, U. S. Patent 5,932,329 in view of Colmon et al, U. S. Patent 4,584,236, further in view of Shibata et al, U. S. Patent 5,132,161 . This ground of rejection is respectfully traversed.

As stated previously, the Frost et al patent discloses a laminated glass structure that is comprised of two glass sheets between which is positioned an infrared-reflecting layer that is a laminate of at least one silver layer embedded between metallic and/or dielectric layers. There is no other infrared reflecting layer within the structure of the laminate. The Ag based infrared reflecting layer of the laminate has the same structure of the antisun layer structure of the laminated glazing of the present invention. On the other hand, there is absolutely no teaching of the presence of some other infrared reflecting layer in the laminate disclosed, and certainly not the low emissivity infrared reflecting layer of the presently claimed laminate as indeed acknowledged by the Examiner at page 2, line 3 of the Office Action.

The Examiner combines the disclosure of the Colmon et al patent, which discloses a window pane that is coated with a low emissivity oxide coating, in an attempt to suggest that one of skill in the art, having considered both Frost et al and Colmon et al, would have deemed it obvious to, in addition, position the low emissivity coating of Colmon et al at an inside position of the laminate of Frost et al, thereby arriving at the present invention.

Applicants do not concur.

Applicants first point out that the technology of Colmon et al is much older technology than that of Frost et al. This is important because the technology of Colmon et al is limited to a means of providing a single glass pane with a coating that provides some measure or ability to increase the reflection of infrared radiation from the single glass pane when it is placed in its position in a vehicle. As such, the single face of the glass pane that

faces the interior of a vehicle is the obvious position that would be exposed to a lesser degree of erosion and wear in comparison to the “other side” of the glass pane that faces the exterior environment of the atmosphere. There is no teaching or suggestion in the patent of a laminated window glazing that is constructed of at least two glass panels, nor a disclosure of providing such a laminate with an infrared reflecting layer of some sort. The patent appears to disclose a single glass pane that is effectively provided with infrared reflecting capability with only one infrared light reflecting layer! Neither of the two cited patents provides any motivation to one of skill in the art to go beyond the scope of the disclosures of the two patents by taking the “leap” of modifying the laminated structure of the window glazing of Frost et al by adding or inserting yet another type of infrared reflecting layer material, i. e., a low emissivity transparent coating, between the laminated glass panes in order to somehow, with benefit, augment the already effective infrared light reflecting capability of the antisun laminate disclosed in Frost et al. One of skill in the art, in fact, would not easily combine the disclosures of the two references, because the addition of a low-emissivity stack of layers will decrease the luminal transmission of the glazing which is an important parameter in the vehicle glazing domain, particularly for windshields. Usually, a glazing provided with only an anti-sun stack has just the luminal transmission needed regarding the norm. One of skill in the art would have to re-define the anti-sun stack to stay within the norm when adding a low-emissivity stack to the glazing. The laminate of Frost et al which contains the anti-sun laminate of at least one metal layer between metallic and/or dielectric oxide layers in no manner suggests the need for additional infrared reflecting layers in order to somehow be “better” at reflecting infrared radiation.

The Shibata et al patent does not improve upon the deficiencies of either Frost et al or Colmon et al, because, although the patent discloses a laminate of glass plates that is useful as an automobile window glazing which contains a laminated structure of several dielectric

layers as an infrared light reflecting medium, not only is the layered light reflecting medium of the patent not the same as the layered antisun structure of the Frost et al patent, but the antisun laminate described by Shibata et al is employed in a quite different context than the infrared light reflecting layers of both Frost et all and Colmon et al. That is, the teaching of Shibata et al is of a several dielectric layered, infrared light reflecting structure that does not comprise at least one metal layer in its structure, because of the necessity of not having a layer such as Ag in the structure that would inhibit the reception of radiowaves (see column 1) that would be received by antenna conductor 4 in the window glazing of the patent. In fact, any such electromagnetic wave shielding metal can not be used in the infrared reflecting laminate of Shibata et al. The scope of the laminated infrared reflecting laminated structure of Shibata et al is limited to non-metal layer containing laminates such as  $Ta_2O_5/CrN_xO_y/Ta_2O_5$ ,  $ZnO/Ti_xNO_y/ZnO$  and  $TiO_2/TiN/TiO_2$ . Thus, the Shibata et al patent is of less relevance to the present invention than the disclosure of Frost et al which at least discloses an infrared light reflecting laminate that is comprised of at least one metal layer such as of Ag on either side laminated with dielectric layers. Clearly, the prior art ground of rejection fails and must be withdrawn.

As to the matter of Claims 25, 25 and 38, the materials used for and the positioning of the intercalating sheet between the panels of the window pane are secondary aspects of the invention. Thus, withdrawal of the rejection of these claims over the cited combination of references is respectfully requested.

As to the subject matter of Claim 27, the only disclosure of a low emissivity coating in the cited references is in the Colmon et al patent which only shows the positioning of a low emissivity coating on one of two layers of a single panel of glass. Such a disclosure hardly suggests present Claim 27.

Claims 29 and 37 are directed to the aspect of the invention of the thickness of the glass sheets that are employed to manufacture the glazing of the present invention. However, the thickness of the glass sheets that make-up the glazing of the invention is a secondary feature of the invention is based. Further, in view of the dependency of these claims on a claim which is believed to be distinguished over primary references, these two claims are patentable over the cited and applied prior art.

Claims 21 and 34 are also directed to a secondary aspect of the invention. In fact, these two claims depend upon Claim 19 and therefore incorporate all the limitations of Claim 19 therein which have been shown above to be patentable over the most relevant prior art. Accordingly, these claims are also patentable over the cited art.

Claim 22 stands rejected based on 35 USC 103(a) as obvious over Frost et al, U. S. Patent 5,932,329 in view of Colmon et al, U. S. Patent 4,584,236, further in view of Shibata et al, U. S. Patent 5,132,161 . This ground of rejection is respectfully traversed on the basis that the claim incorporates all of the limitations of Claim 19 therein which thereby are believed sufficient to distinguish the claim over the cited primary references. Layers of silver are well known to reflect infrared radiation. Withdrawal of the rejection of these claims is respectfully requested.

Claim 28 stands rejected based on 35 USC 103(a) as obvious over Frost et al, U. S. Patent 5,932,329 in view of Colmon et al, U. S. Patent 4,584,236, in view of Shibata et al, U. S. Patent 5,132,161 and further in view of Anderson et al, U. S. Patent 5,602,457. This ground of rejection is respectfully traversed.

The subject matter of Claim 28, as it is directed to first and second thermoplastic sheets as intercalating sheets, is directed to a secondary aspect of the intention. This claim is ultimately dependent upon the laminated glazing of Claim 19 which has been shown to be clearly distinguished over the cited and applied primary references. Further, although the

Anderson et al patent discloses a tinted PVB layer, this is subject matter that is of secondary interest in the invention. As just stated, Claim 19, upon which Claim 28 ultimately depends, is distinguished over the cited art and therefore provides basis for distinguishing the subject matter of Claim 28 over the cited prior art. Withdrawal of the rejection is respectfully requested.

Claim 30 stands rejected based on 35 USC 103(a) as obvious over Frost et al, U. S. Patent 5,932,329 in view of Colmon et al, U. S. Patent 4,584,236, in view of Shibata et al, U. S. Patent 5,132,161, further in view of Van Laethem et al, U. S. Patent 3,801,423 and in view of Rieser et al et al, U. S. Patent 4,107,366. This ground of rejection is respectfully traversed.

The subject matter of Claim 30, which is directed to a glass pane that is either toughened or rendered convex, is another secondary aspect of the invention. Again, this claim is dependent directly upon Claim 19 which has been demonstrated to be patentably distinguished over the cited and applied primary references. Therefore, the Claim 30 stands patentable over the art of record. Withdrawal of the rejection is respectfully requested.

Claims 31 and 35 stand rejected based on 35 USC 103(a) as obvious over Frost et al, U. S. Patent 5,932,329 in view of Colmon et al, U. S. Patent 4,584,236, in view of Shibata et al, U. S. Patent 5,132,161 and further in view of Iida et al, U. S. Patent 5,073,451. This ground of rejection is respectfully traversed.

The Examiner misapplies the Iida et al patent in rejecting present Claim 31. As the patent discloses at the top of column 6, the multilayer coating of the reference, which is positioned on a glass plate, is comprised of electrically resistant oxide and nitride layers. No electrically conductive layer such as a silver layer, ITO layer or TiN layer is included in the stack of dielectric layers. The reason electrically conductive layers are excluded from the infrared reflecting dielectric layers is because the resulting glazing would exhibit an electromagnetic shielding effect which would preclude the passage of radio waves through

the glazing thereby not allowing the pick-up of radio waves by an antenna elsewhere in the vehicle. On the other hand, the antisun structure of the presently claimed laminated glazing includes at least one conductive metal layer such as of Ag which functions itself as a receiving antenna for radio waves that strike the laminated glazing of the invention (see page 6 of the text). Thus, the multi-layer laminate of the present antisun layer of the present claims does not pass radio waves therethrough which is contrary to the requirements of Iida et al. Further, since Claim 31 is directly dependent on Claim 19, it incorporates the limitations of Claim 19 therein which is patentably distinguished over the primary references.

Claim 35 is distinguished over the applied prior art in view of its dependency on Claim 19. Moreover, the claim which requires an antisun layer comprised of a dielectric layer of AlN or Si<sub>3</sub>N<sub>4</sub> and at least one metallic layer (Ag) is not consistent with the requirements of Iida et al as discussed above. Accordingly, the rejection of Claim 35 can not be maintained and withdrawal of the rejection is respectfully requested.

Claim 39 stands rejected based on 35 USC 103(a) as obvious over Frost et al, U. S. Patent 5,932,329 in view of Colmon et al, U. S. Patent 4,584,236, in view of Shibata et al, U. S. Patent 5,132,161 and further in view of Miyazaki et al, RE 37,446. This ground of rejection is respectfully traversed.

The subject matter of Claim 39 is directed to another secondary aspect of the invention. Again, this claim is dependent directly upon Claim 19 which has been demonstrated to be patentably distinguished over the cited and applied primary references. Therefore, the Claim 30 stands patentable over the art of record. Withdrawal of the rejection is respectfully requested.

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It is now believed that the application is in proper condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,

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